TEST OSIRIS

(ON LINE SEARCH INFORMATION RETRIEVAL INFORMATION STORAGE)

A. KENNETH SHOWALTER
INFORMATION SCIENCES
AND PLANS BRANCH
NAVAL MATERIAL COMMAND
WASHINGTON, D.C.

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ABSTRACT

The OSIRIS system is a prototype information retrieval system having the following components:

a. An automated microfiche file having a capacity of 5000 punch card sized microfiche with a remote control 21" TV console for retrieving, magnifying (0-250X), and displaying any of the images on the microfiche.

b. A remote computer terminal for the storage, search and retrieval of index, abstract and microfiche file image location information.

Preliminary tests have been carried out with the CRT/microfiche retrieval equipment mentioned in a. above, using various forms of documents under different reduction ratios. A particularly exciting discovery was made when a new microreduction technique allowing a 260:1 reduction was tested. A 4"X6" fiche containing 6000 12"X15" images at a 260:1 reduction was placed in the retrieval televisor and one of these images was successfully displayed full screen on the TV monitor. Using this storage technique, it would be possible to store up to 50,000,000 8 1/2"X11" pages of information on the file.

INTRODUCTION

Acronymology has become more than just a fad in the U.S. especially in the Defense Department where one needs a glossary to keep up with new terms. It seems that having a catchy acronym is more important than having a system to back it up. I must admit to adding one more to the list but I hope in this case that both the acronym and the system prove equally appropriate.

The myth of Osiris, an Egyptian god, makes for an interesting analogy with information and information systems. Osiris was the son of Geb (the earth) and Nut (the heavens), and was the sum of all beneficent agencies. He was murdered by his brother, Set, and his body was torn into 14 pieces and scattered all over the earth. Isis, Osiris's sister, who undoubtedly conceived the first mythological retrieval system, then searched until she had found most of the pieces and she resurrected him. Osiris and Isis were married and she bore a child. Osiris then became king and judge of the dead and it is through him that all contacts with the dead in the underworld are made.

Surely we can consider information as the source of all human endeavors and that vast amorphous mass of information our civilization produces is certainly an underworld. In order to resurrect a particular item of information we must hav help. This is precisely what this latter day OSIRIS attempts to do.

BACKGROUND

It is a fact of life that today every individual in the Naval Material Command has an information handling problem. Our managers must have information that is current, accurate, and succinct upon which to base their decisions. Our scientists and engineers must be made continually aware of new state of the art developments so that they can take advantage of them in the design and development of new systems. Staff workers must be able to ferret out the intricate relationships among policy, applicable instructions, directives, and informal "drafts" in order to be responsive to requirements placed on them and also to be aware of what is going on in their working environment. Our message centers and mail rooms are tremendously taxed to keep up with the, at times, overwhelming volume of incoming material they must process. They are very hard put to handle the input much less worrying about better techniques for dissemination and storing the information for future reference. At the secretarial and clerical level the picture is just as bad, the secretaries and clerks are all bogged down in filing and there is no immediate hope of relief using present techniques.

All of these people spend the majority of their time immersed in a continual flow of information and most of this information is in the form of documents ranging from a handwritten note to a 5000 page report. There are individual differences in the particular types of problems they face but in general there are four basic aspects to information handling:

1. Input: How to organize, assemble, index, or somehow reduce the incoming information to a meaningful form and to fit it into current workload?

2. Processing: What to do with the information, how does it relate to previous information, and how might it relate to future items of information? What action(s) must be taken as a result of receiving this information?

3. Output: What is the resultant of the process performed? Has a new item of information been generated as a result of processing or has the flow of information been terminated?

4. Storage: What is done with the information, either the input, the output or both? What is the best technique for storing it for future reference?

All of these basic problems are included in the burgeoning new field or *information sciences, and the most* crucial problems are those dealing with Information Storage and Retrieval.

Many individuals and groups within the Command have come to, as in the past, and continue to contact us for help in solving the kinds of problems they face in dealing with the "information explosion." We have been able to apprise these people of what has been done, what is being done and what can be done in certain areas of applications similar to their own. We are able to cite, study upon study, to them, but we have found that it is very difficult for us to show them just how some of these potential applications would work in their own situations.

We have therefore reached the conclusion that what is needed is a practical demonstration of these potential applications in as nearly an operational environment as we could create with user participation and using real life information formats.

Test OSIRIS is intended to be just such a practical expression of the Information Sciences and Plans Branch's continuing search for better techniques, methods, and systems for acquiring, processing, storing, retrieving and displaying information.

We hope that in conducting the test to give various groups within the Command first hand experience with some of the latest principles in information sciences using state of the art technology and methodology.

In addition, it is hoped that in testing these principles, we may prove the feasibility and utility of many of them for future use. If this is the case, we hope to continue development of the system including both the hardware and the software involved for possibly wider applications within the Naval Material Command.

SYSTEM CONCEPT

It is our feeling based on an appraisal of the current state of the art in information retrieval technology that for large document handling systems microforms are the most efficient storage medium and the computer is by far the best search and retrieval device. This opinion seems well supported in view of the increased emphasis in microform storage capabilities and already well proven computer retrieval techniques.

The system we have chosen as a test vehicle embodies both of these concepts. We feel that the combination of the two results in an extremely powerful and versatile system. The OSIRIS system as it is presently configured has the following features:

- A large capacity microfiche file for document storage
- Remote random access video display of microfiche documents
- Random access mass computer storage
- A remote time shared computer terminal

Possible later additions, all of which are commercially available include:

- Multiple computer terminals and video displays
- A single terminal for both video and data display
- Remote and on-site hard copy generation
- Time-shared video disc, drum or tape storage
- Broad band data, voice and video transmission
- A 200,000 card capacity file
- Digital transmission of video over single phone lines
- English language type computer terminal queries

The strategy we are employing in testing the system (Fig 1) is to use the microfiche storage retrieval and display system for various types of full document files and to store the indices and abstracts on a random access computer file. We have invited potential users of such a system from our Command to store sample document files in the system and to access their material on the video monitor using either manual or computer retrieval techniques. Using the computer terminal, the user will conduct his search in the usual interactive manner using Boolean search techniques by subject, keyword, author, etc. He will be able to list either the title or abstract of those documents which seem to satisfy his request along with the microfiche file location number. It is at this point that the OSIRIS system goes one step further than most retrieval systems in that it allows the user to review the final product, the actual referenced document, "on-line."

SYSTEM OPERATION

Fig 2 shows the automated microfiche storage retrieval and display system. The retrieval file stores 5,000 microfiche on aperture cards in a rotary drum having 50 bins with 100 cards in each bin. In Fig 4 an exposed view shows the drum, the X-Y platen which receives the card during retrieval, and the TV camera. There are two display monitors on the System, one a 17" TV located with the central file and a remote console with a 21" screen. Any one of the cards can be accessed and any portion of it televised and magnified from 5X to 250X from either the central file console or the remote console which is cabled to the retrieval file.

Fig 3 is the remote console with controls and indicators. To retrieve a card containing a document to be viewed the operator takes the index number he has received as a result of a manual or computer search and keys it in on the keyboard (example 4671, bin 46, card 71). He then depresses the left, center or right platen position button #12 depending on which area of the card he wants to view. Next he depresses the Search button #10 and the retrieval cycle begins. The drum will revolve to the selected bin (00-49) and then the selected card (00-99) will be forced up into the glass X-Y platen in front of the camera lens. Once the card or microfiche is in the platen the operator can move the card in any X-Y direction by manipulating the joystick control #5 and by turning the knob he can zoom the camera in and magnify any portion of it from 5X-250X. Once the operator is finished viewing he depresses the Return button #11 and the card is returned to the file.

TEST RESULTS TO DATE

The retrieval file was originally designed for photographic storage but we felt it had even greater potential for textual and graphic material and acquired it from the original user for this purpose. It has not been in extensive use the past year or so and we have experienced considerable delay in getting the system in perfect operating order. In addition the "on-line" computer terminal installation has been fraught with the usual problems. We have, however, been able to conduct limited tests with a wide range of material and the results are extremely encouraging. Probably the most interesting discovery is in the range of microfiche reduction ratios the system can display. Standard reduction ratios are on the order of 10-45:1. In this range alpha-numeric text, greytones, and graphic material are as legible on the screen as the original hard copy. That the system can also blow back legible reproductions of high density microfiche with reduction as high as 260:1 is phenomenal. With standard ratios it is possible to store 20-200 8 1/2"x11" pages on a microfiche, using a 250:1 reduction ratio, it is possible to store over 10,000, giving the file a capacity of 50,000,000 pages.

Although we are not able to bring this high density material back to its original size with this camera, the manufacturer can modify our existing system to give us a 500X magnification capability which should be more than adequate and possibly further extend the reduction ratio capability.

Another pleasant discovery is the remarkable clarity and ease of viewing a TV display of microforms allows. The combination of the joystick movement, zoom magnification, and a reversal switch for changing a negative to a positive image make it possible for one to review and read documents on the TV monitor for a considerable period without any fatigue. In fact the TV display is far superior to most optical microform viewers we have had experience with. A poor quality microform can also be enhanced with the use of the camera and monitor controls so that the display is actually better than the original.

We are very encouraged by the results of the initial tests for they indicate that the system has capabilities beyond those of many current systems, and we have not yet fully explored its potential applications by any means. We are now in the process of microfilming other users' documents for additional storage in the system. We plan to have computerized indexes to these files in operation by this Fall.

PROGNOSIS

It has become apparent to us as well as to many other information system designers that the computer alone cannot solve all our problems. Just as methodological solutions require a multi-disciplinary approach technological solutions may also require a multi-media information handling system such as the combination of TV, microforms, and a computer. Industry and science present us with new capabilities almost daily. It is imperative then that the systems designer be aware of these capabilities so that he may evaluate their utility and potential system applications. We feel certain that systems similar to OSIRIS will be developed in the next few years, and we hope our efforts will have helped in the development of these systems.

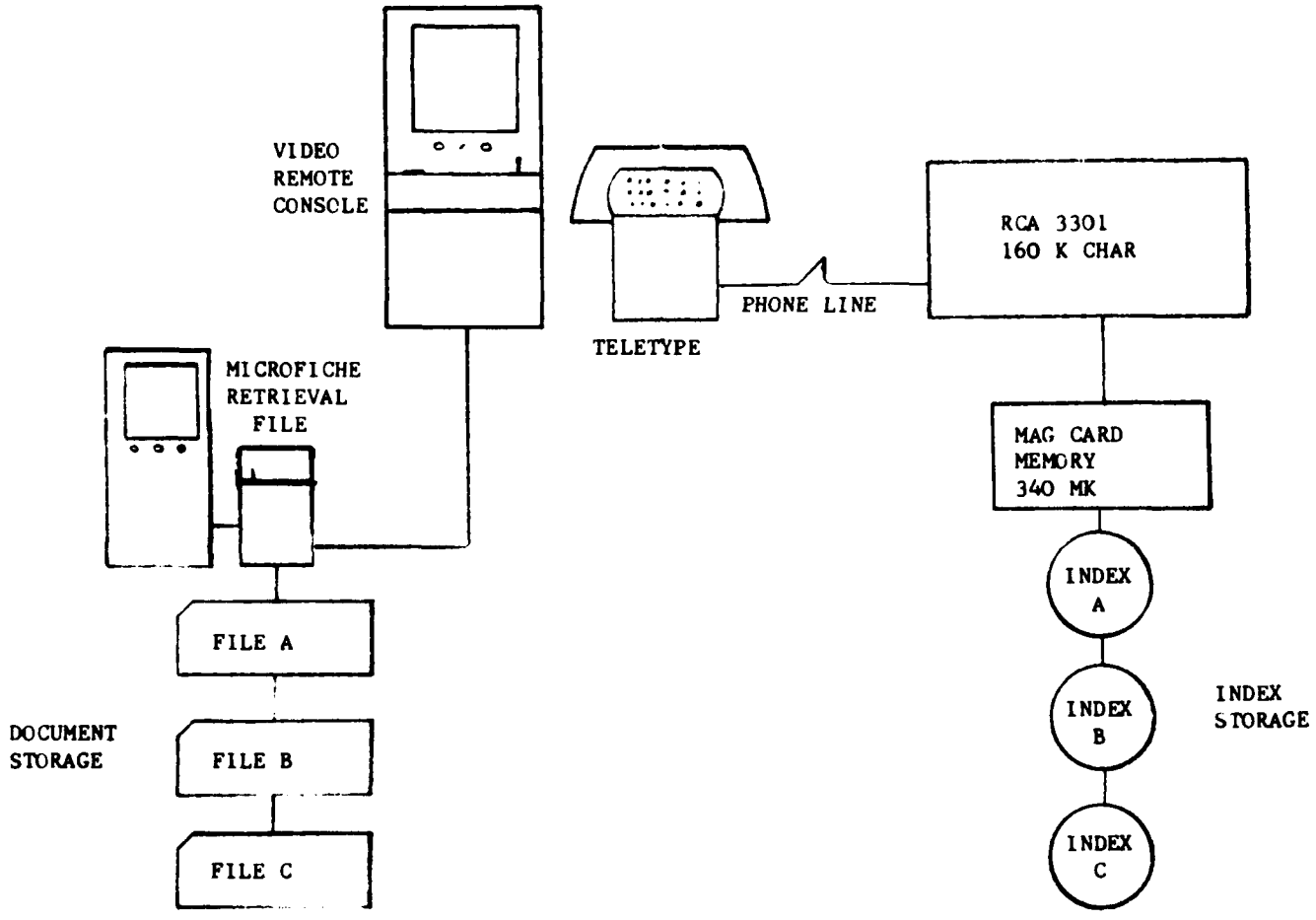

FIG 1 OSIRIS CONFIGURATION

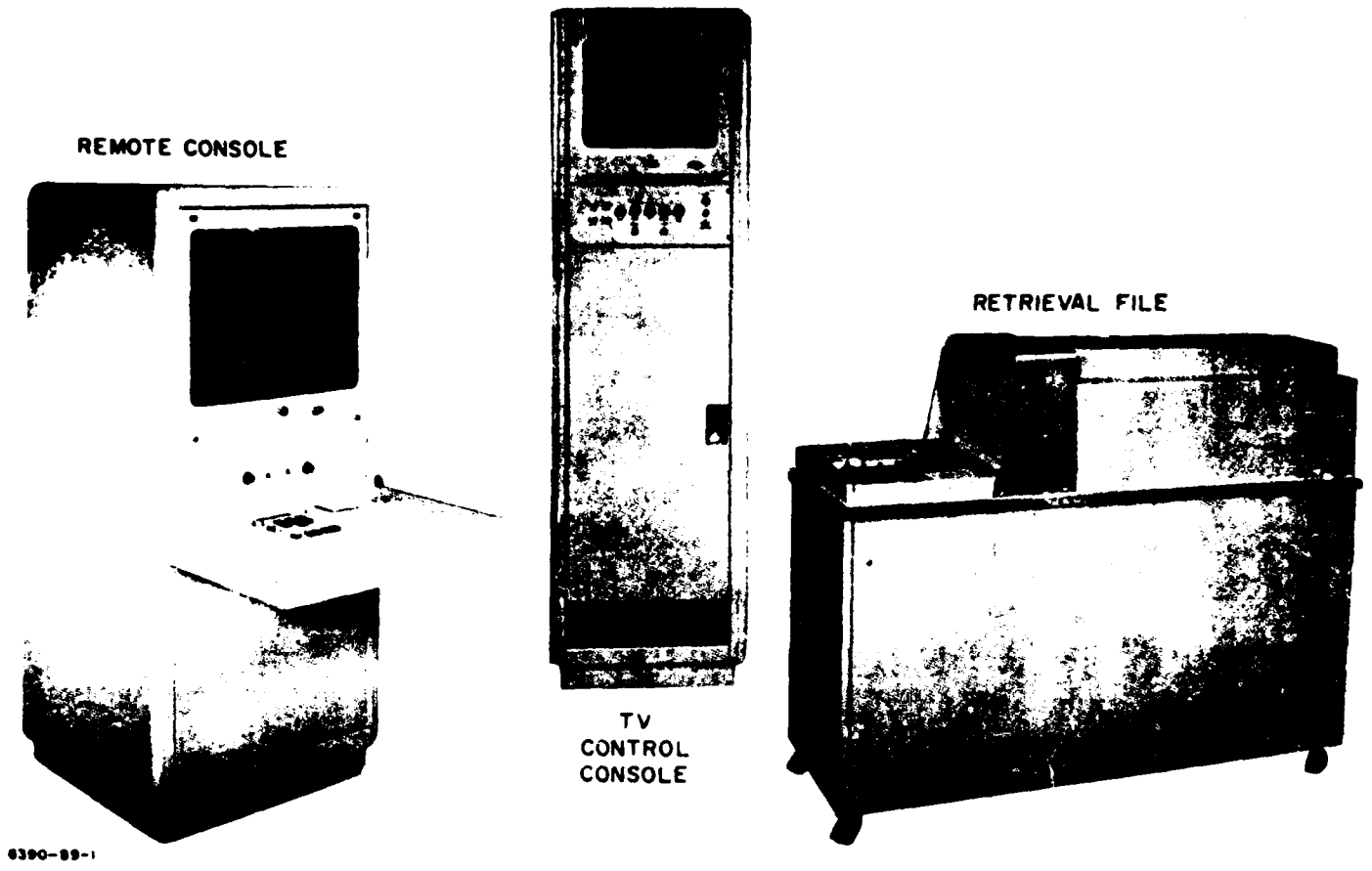

Figure 2 Graphic Data Storage, Retrieval, and Display System

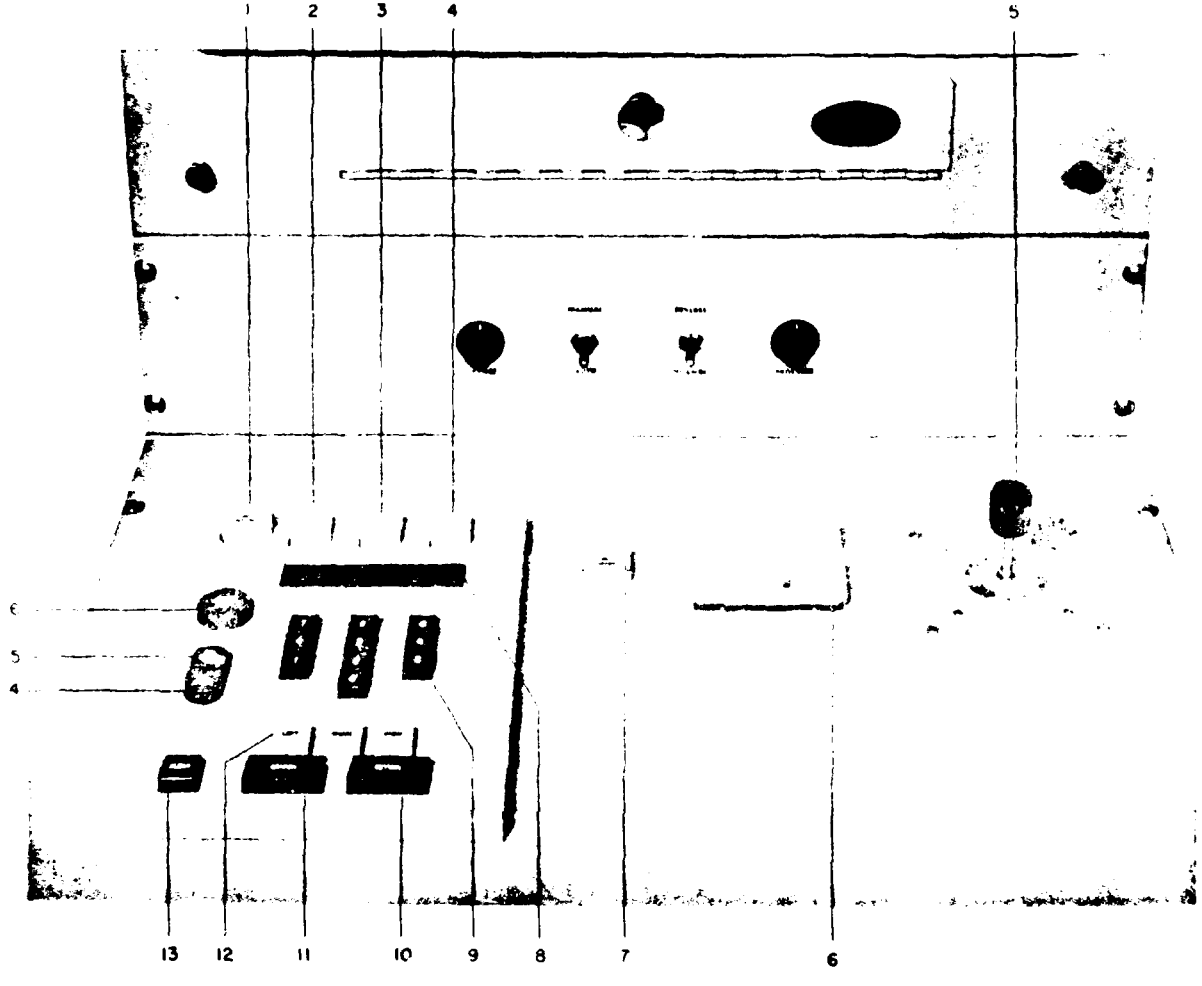

Figure 3 Remote Console, Controls and Indicators

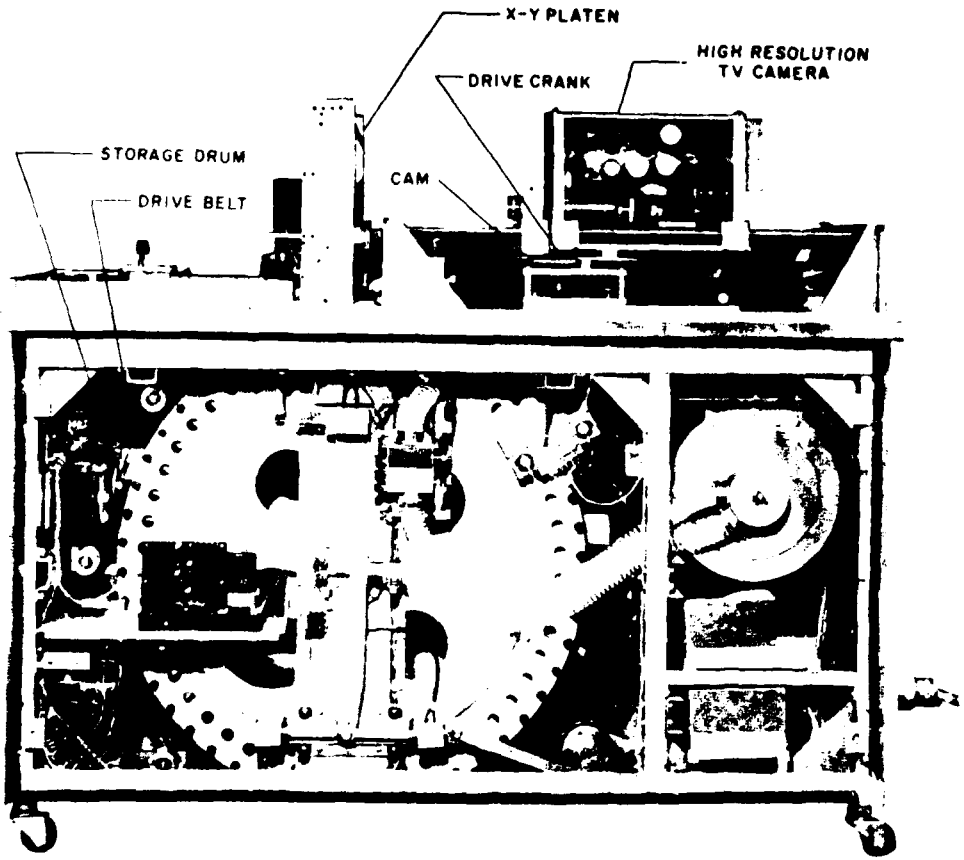

Figure -4. Right Inside View of Retrieval File